SUBJECT: Risk Analysis for the Unimatic Manufacturing Corporation Site

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Introduction

The site is an operating manufacturing facility with a previous history of PCB discharge to the surrounding surface and sub-surface soils. During September and October, 2012 soil sampling for PCBs was performed at the site. In addition, sampling for PCBs was conducted within the facility - which included indoor air samples, surface wipe samples, bulk microvac samples of surface dust and chip samples of building substrate (walls and floors). The following analysis compares relevant exposure pathways to risk-based exposure benchmarks.

Exposure Assessment

Facility workers are subject to multiple sources/pathways of PCB exposure. First and foremost exposure is presently occurring through the inhalation pathway as all seven indoor air samples registered PCB (Aroclor 1242) concentrations orders-of magnitude above background (3-10 **nanograms**/m^3) for urban areas. The mean indoor air concentration of PCBs is 7.3 **micrograms**/m^3 (range 1.9 – 20). In addition, contact with building surfaces coated with PCB (Aroclor 1248) residuals would be a secondary source of exposure via percutaneous absorption and incidental ingestion. Furthermore, contact with contaminated soil would add to exposure from percutaneous absorption and incidental ingestion.

Toxicity Assessment

PCBs exhibit both cancer and non cancer health effects. Increased chlorine substitution on the biphenyl ring contributes both to increased cancer and non-cancer potency. For this assessment, the oral cancer Slope Factor (2.0 per mg/kg/day) and the Inhalation Unit Risk (5.7 E-04 per ug/m^3) for persistent (highly chlorinated) PCBs were employed. For non-cancer health effects, the Reference Dose (RfD) for Aroclor 1254 (2 E-05 mg/kg-day) was employed to assess both oral and inhalation exposures. There is precedent for using the oral RfD to assess inhalation exposure as per the EPA-ORD screening values for PCBs in schools.
(http://www.epa.gov/epawaste/hazard/tsd/pcbs/pubs/caulk/maxconcentrations.htm).

Risk Characterization

EPA's Removal Management Levels (RMLs) (http://epa-rals.ornl.gov/) do not list exposure guidelines for the air pathway. However, exposure guidelines for the air pathway which are consistent with the risk benchmarks for the Removal Program (i.e., excess lifetime cancer risk of 1 E-04 or a Hazard Index = 3 for non-cancer health effects) can be readily extracted from other EPA risk assessment documents. EPA's Risk Screening Levels (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_bwrun_NOV2012.pdf) establishes an exposure guideline of 2.1 ug/m^3 equating to a 1 E-04 cancer risk for the air pathway in an industrial exposure scenario. However, the EPA-ORD PCB Exposure Guidelines for Schools (see above) establishes a concentration of .45 ug/m3 for adult workers (e.g., teachers, staff, custodians), which equates to a Hazard Index = 1. Multiplying by 3, the Removal Management Level (HI = 3) based on non-cancer health effects is 1.35 ug/m3.

As noted above, the mean indoor air concentration of PCBs within the Unimatic Manufacturing Corporation facility is 7.3 ug/m3, which significantly exceeds both the non-cancer and cancer Removal Management Levels. In addition, workers in the facility are being exposed to PCBs by contacting contaminated surfaces within the facility and by contacting and/or incidentally ingesting soil outside the facility. Actions should be expedited to mitigate these exposure pathways.